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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/554,941	05/22/2000	HOWARD JOHN ATKINSON	S-30287A	5118

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SYNGENTA BIOTECHNOLOGY, INC.
PATENT DEPARTMENT
3054 CORNWALLIS ROAD
P.O. BOX 12257
RESEARCH TRIANGLE PARK, NC 27709-2257

EXAMINER

KUBELIK, ANNE R

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/554,941	Applicant(s) ATKINSON ET AL.	
	Examiner Anne R. Kubelik	Art Unit 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-11,13,14,16 and 18-24 is/are pending in the application.
- 4a) Of the above claim(s) 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-11,13,14,16, 18-22, 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on none in case is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. The amendments filed 28 July 2003 have been entered. Claims 1-2, 4-11, 13-14, 16 and 18-24 are pending.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claims 1-2, 4-11, 13-14, 16, 21-22 and 24 remain rejected under 35 U.S.C. 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that linker peptides are described on pg 7-9 of the specification, including the preferred amino acids for the linkers (response pg 8).

This is not found persuasive because pg 7-9 of the specification only states that "The function of the linker peptide is to join the anti-pathogenic proteins or protein domains without disturbing their function", describes some generally desirable features of "natural" linkers and describes 6 specific linkers. The instant claims are drawn to linkers of any size and sequence. The specification does not describe linkers within the full scope of the claims.

Applicant urges that the structural features of anti-pathogenic proteins are described on pg 6-7 of the specification (response pg 8-9).

This is not found persuasive because pg 6-7 describe several proteins what are anti-pathogenic, but does not describe anti-pathogenic domains nor does it describe anti-pathogenic proteins and domains within the full scope of the claims.

Applicant urges that one of skill in the art, using the teachings of the specification and what is known in the art, discern which proteins and domains are anti-pathogenic and which are not (response pg 9).

This is not found persuasive because the specification must describe does not describe anti-pathogenic domains within the full scope of the claims, and it does not. The specification does not describe the features that distinguish proteins and protein domains that are anti-pathogenic from those that are not

4. Claims 1-2, 4-11, 13-14, 16, 21-22 and 24 remain rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of improving the nematode resistance of a plant by transformation with a DNA construct encoding the protease inhibitors Oc-1ΔD86 and CpTI joined by a linker peptide of SEQ ID NOs:1, 2 or 11, does not reasonably provide enablement for a method of improving the resistance of a plant to any pathogen by transformation with any DNA construct encoding any two anti-pathogenic proteins joined by a linker peptide of any size. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that one of skill in the art would recognize that different nematodes would have size constraints with respect to ingestion of proteins and whether the proteins are

small enough for ingestions is not determinative for whether the instant invention is enabled because the claimed invention is directed to proteins that are ingestible (response pg 10).

This is not found persuasive because the specification does not teach the size limitations nor does it teach anti-pathogenic domains and linkers that are within the full scope of the claims and that are ingestible. Additionally, as Unwin et al shows that nematodes of different species have different size limits in the proteins they can digest, undue experimentation would be required to screen through the multitude of possible constructs comprising nucleic acid encoding anti-pathogenic proteins and protein domains and linkers to find those that improve nematode resistance, given the lack of guidance provided for identification or construction of proteins or protein domains that are pathogenic to nematodes.

Applicant urges that Gleddie et al merely speculates that protease inhibitors should be translated to the appropriate cellular location (response pg 11).

This is not found persuasive. The specification fails to provide evidence that teaches that Gleddie is wrong, *i.e.*, it fails to teach that protease inhibitors directed to any cellular location function in the instant invention.

Applicant urges that linker peptides are described on pg 7-9 of the specification, including the preferred amino acids for the linkers (response pg 11).

This is not found persuasive because those pages of the specification only describes some generally desirable features of “natural” linkers and teaches 6 specific linkers. The instant claims are drawn to linkers of any size and sequence. The specification does not teach linkers within the full scope of the claims.

Applicant urges that the anti-pathogenic proteins are taught on pg 6-7 of the specification (response pg 11).

This is not found persuasive because pg 6-7 describe several proteins what are anti-pathogenic, but does not teach anti-pathogenic domains nor does it teach anti-pathogenic proteins and domains within the full scope of the claims.

5. Claims 1-2, 4-11 and 18-22 remain rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. Dependent claims are included in all rejections.

The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that the claims have been amended to address the rejections (response pg 11-12).

This is not found persuasive because the following rejections is new, due to amendment:

Claims 1 and 18 are indefinite in their recitation of "and optionally generating a descendent plant". the method appears to be one in which transformation with the construct encoding the fusion protein produces a plant with nematode resistance and optionally produces a descendent plant. However, producing a descendent plant requires more than transformation. Producing a descent plant is a further step, not a result of transformation.

Claim Rejections - 35 USC § 102

6. Claims 1-2, 7, 13-14 and 16 remain rejected under 35 U.S.C. 102(b) as being anticipated by Anderson et al (WO 94/13810). The rejection is repeated for the reasons of record as set forth

in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that one of skill in the art would not view the type II protease inhibitor domains as linkers, but as functional domains of the protein itself. Applicant urges that the specification indicates that the function of the linker is to join anti-pathogenic domains without disturbing their function and the domains do not do that (response pg 12).

This is not found persuasive because the functional domains join anti-pathogenic domains without disturbing their function; thus, they are linkers as defined in the specification.

Applicant urges that Anderson et al does not mention nematodes and a method of improving nematode resistance and thus do not anticipate the claimed invention (response pg 12-13).

This is not found persuasive because the method taught by Anderson et al would inherently produce nematode-resistant plants.

7. Claims 1-2, 7, 13-14 and 16 remain rejected under 35 U.S.C. 102(e) as being anticipated by Anderson et al (US Patent 6,031,087, 102(e) date September, 1995). The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that one of skill in the art would not view the type II protease inhibitor domains as linkers, but as functional domains of the protein itself. Applicant urges that the specification indicates that the function of the linker is to join anti-pathogenic domains without disturbing their function and the domains do not do that (response pg 12).

This is not found persuasive because the functional domains join anti-pathogenic domains without disturbing their function; thus, they are linkers as defined in the specification.

Applicant urges that Anderson et al does not mention nematodes and a method of improving nematode resistance and thus do not anticipate the claimed invention (response pg 12-13).

This is not found persuasive because the method taught by Anderson et al would inherently produce nematode-resistant plants.

8. Claims 13 and 21 remain rejected under 35 U.S.C. 102(b) as being anticipated by Atkinson et al (WO 96/16173). The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that one of skill in the art would not view the fragments as linkers, but as functional fragments of the particular proteins used to make the hybrid. Applicant urges that the specification indicates that the function of the linker is to join anti-pathogenic domains without disturbing their function and the domains do not do that (response pg 13).

This is not found persuasive because the functional domains join anti-pathogenic domains without disturbing their function; thus, they are linkers as defined in the specification.

Claim Rejections - 35 USC § 103

9. Claims 1-2, 4-5, 7-8, 13-14, 16 and 21-22 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Atkinson et al (*supra*) in view of Lilley et al (1996, Parasitology 113:415-424). The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that one of skill in the art would not view the fragments as linkers, but as functional fragments of the particular proteins used to make the hybrid. Applicant urges that the specification indicates that the function of the linker is to join anti-pathogenic domains without disturbing their function and the domains do not do that (response pg 14).

This is not found persuasive because the functional domains join anti-pathogenic domains without disturbing their function; thus, they are linkers as defined in the specification.

Applicant urges that nowhere is it taught or suggested that the proteins should be expressed as a fusion proteins in plants and that one of skill in the art would appreciate that the proteins can be expressed on separate constructs (response pg 14-15).

This is not found persuasive because Atkinson et al also disclose plants transformed with the DNA fusion constructs and DNA fusion constructs encoding Oc-IAD86 and another protein (claims 47-48). Thus, expression of fusion constructs in plants is taught.

10. Claims 1-2, 4-8, 13-14, 16 and 21-22 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Atkinson et al in view of Hephher et al (1992, EP 502,730) and Conkling et al (US Patent 5,837,876, filed July, 1995). The rejection is repeated for the reasons of record as set forth in the Office action mailed 27 January 2003. Applicant's arguments filed 28 July 2003 have been fully considered but they are not persuasive.

Applicant urges that hindsight reasoning appears to have been used in creating this rejection and that the documents merely cite a list of possible protease inhibitors and promoters. Applicant urges that nowhere in Hewpher is it disclosed or suggested that inhibitors can or should be expressed in combination or as fusion proteins (response pg 15-16).

This is not found persuasive because Hephher et al teach combinations and their expression in claims 27-48.

Applicant urges that the combination of Atkinson et al and Hephher et al do not result in the claimed invention because nowhere is it disclosed that the protease inhibitors can be joined by linkers, and even if there were, there is nothing to motivate one skilled in the art to use the inhibitors of Hephher et al in the constructs of Atkinson et al (response pg 16).

This is not found persuasive because substitution of the cowpea trypsin inhibitor of Hephher et al for the cowpea cysteine protease inhibitor of Atkinson et al is an obvious design choice.

Applicant urges that Conkling et al is only relevant for the subject matter of claim 6 and it fails to remediate the other deficiencies of Atkinson et al and Hephher et al (response pg 16).

This is not found persuasive. Conkling et al is relevant for the subject matter of claim 6 and is not needed to remediate the other deficiencies of Atkinson et al and Hephher et al because they do exist.

in inhibitor (CpTI) or Oc-1ΔD86, and wherein the constructs are expressed from root-specific promoters, DNA constructs used in that method and plants so transformed.

The teachings of Atkinson et al are discussed *supra*. Atkinson et al do not teach constructs in which CpTI is one of the protease inhibitors, nor do they teach expression of the constructs behind root-specific promoters.

Hephher et al teach a method of producing nematode resistant potato plants by transformation with a DNA construct encoding CpTI (example 1-2) and isolation of the gene for oryzastatin (example 6).

Conkling et al teach a root specific promoter from tobacco (SEQ ID NO:1).

Allowable Subject Matter

11. Claims 18-20 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne R. Kubelik, whose telephone number is (703) 308-5059. The examiner can normally be reached Monday through Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson, can be reached at (703) 306-3218. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9307 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the patent analyst, Kimberly Davis, at (703) 305-3015.

Anne R. Kubelik, Ph.D.
November 12, 2003



AMY J. NELSON, PH.D.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600